

REMARKS

Claims 46-65 are pending in the present application. Claims 46-51 stand as originally filed without any amendments, and claims 52-65 are new claims that have been added to the application in this paper. The originally filed specification supports all of the subject matter for new claims 52-65 at paragraphs 0048-0051 and Figures 4A-6B. Therefore, new claims 52-65 do not add new matter to the application.

In the Office Action dated December 15, 2003, claims 46-51 were rejected over U.S. Patent No. 4,946,550 issued to Van Laarhoven ("Van Laarhoven"). More specifically, the claims were rejected as follows:

- (A) Claim 46 was rejected under 35 U.S.C. § 102 over Van Laarhoven; and
- (B) Claims 47-51 were rejected under 35 U.S.C. § 103 over Van Laarhoven.

A. Response to Section 102 Rejection - Van Laarhoven

In rejecting claim 46 under Section 102 over Van Laarhoven, the Examiner states that Figures 2 and 3 of this reference show a microelectronic substrate assembly having a substrate 10, a first layer 2, a second layer 3 and a third layer 5. The Examiner correctly notes that the first layer is silicon nitride and the second layer is silicon dioxide, and that the silicon nitride and silicon dioxide layers are different colors. The Examiner admits "The reference does not disclose the color or transparency of the resist; those in the art could choose any known and available resist for the resist in such a structure." The Examiner further appears to indicate that the color of the materials is not important by stating "The instant disclosure and claims do not present the choice of resist as in any way critical to the structure . . ." For the reasons stated below, Van Laarhoven not only fails to disclose all of the structural features set forth in claim 46, but a person skilled in the art would not be motivated to make the claimed combination of elements set forth in claim 46 based on Van Laarhoven and the prior art.

Claim 46 is directed toward a microelectronic substrate assembly for use in controlling mechanical and/or chemical-mechanical planarization processes (collectively, CMP processes). The microelectronic substrate assembly comprises a first layer of a first material having a first color, a second layer of a second material disposed over the first layer, and a sacrificial marker layer of a third material. The second material has a second color different than the first color, and the third material has a third color optically distinct from the first and second colors. The optically distinct third color of the third material provides a significant advantage for endpointing CMP processes that use optically controlled planarization systems as set forth in other embodiments of the invention in the present application. For example, the material of the sacrificial marker layer can be selected primarily based on its color to enhance the optical contrast between the first and second layers as opposed to selecting the material based on its conductive, dielectric, heat transfer and/or chemical properties. Therefore, the relative colors of the first layer, the second layer and the sacrificial marker layer are structural elements of claim 46 that provide a significant improvement for controlling CMP processes in accordance with optically controlled planarization tools.

Claim 46 is patentable over Van Laarhoven under Section 102 because this reference fails to disclose the color of its resist layer (i.e., sacrificial layer) relative to the color of its first and second layers. The Examiner admits that Van Laarhoven "does not disclose the color or transparency of the resist," but asserts that this features is anticipated on the grounds that a person skilled in the art could "choose any known and available resist." This assertion is incorrect because a person skilled in the art would select a resist having the correct chemical and physical properties for the particular photolithographic applications disclosed in Van Laarhoven. Clearly, several known and available resists may not be suitable for use in Van Laarhoven. The admission that Van Laarhoven fails to disclose a sacrificial marker layer having a third color optically distinct from the first and second colors is not overcome by such an incorrect assertion. The Section 102 rejection of claim 46 over Van Laarhoven, therefore, should be withdrawn.

Claim 46 is also patentable over Van Laarhoven under Section 103 because a person skilled in the art would not be motivated to select the resist layer in Van Laarhoven to have a color that is optically distinct from either the silicon nitride layer or the silicon dioxide layer disclosed in Van Laarhoven. In selecting a material for forming the resist layer in Van Laarhoven, a person skilled in the art would evaluate whether the material (a) is chemically compatible with the other materials on the substrate, (b) has sufficient coverage, (c) has the proper chemistry for the development/wash process, and (d) has the desired properties for the exposure process. Without the teachings of the present disclosure, a person skilled in the art would not likely select the resist material in Van Laarhoven based on its color relative to the other layers because to do so would limit the choices for the resist material. In fact, selecting a resist based upon color not only further limits the choices for the resist material, but it also requires a person skilled in the art to do further research to either find such a resist or have it custom manufactured. As such, a person skilled in the art would not be motivated to modify Van Laarhoven to have a workpiece including a first layer of a first material having a first color, a second layer of a second material having a second color, and a sacrificial marker layer of a third material having a third color optically distinct from the first and second colors. Therefore, claim 46 is also patentable over Van Laarhoven under Section 103.

B. Response to Section 103 Rejection - Van Laarhoven

Claims 47-51 are patentable over Van Laarhoven because this reference fails to disclose all of the features of these claims for the reasons discussed above with respect to claim 46. Claim 48 is further patentable over Van Laarhoven because this reference completely fails to disclose or suggest that the resist layer 5 shown in Figures 2 and 3 of this reference is an optically transmissive material. Claims 49-51 are further patentable over Van Laarhoven because this reference completely fails to disclose or suggest selecting a resist that is either red, black or white. It will be appreciated that selecting a sacrificial layer to have such colors may require a unique or custom material with the appropriate pigment. Clearly, a person skilled in the art would not be motivated to find such a material or have it manufactured based on Van


Laarhoven's lack of disclosure. Therefore, claims 47-51 are further patentable over Van Laarhoven under Section 103.

C. Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicant accordingly requests reconsideration of the application and a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call Paul Parker at (206) 359-3258.

Respectfully submitted,
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